

### REMARKS

Claims 1-58 are pending in the application. These claims were rejected / objected to as follows:

Claims / Section	35 U.S.C. Sec.	References / Notes
15, 19, 20, 41, 45, 46, 56 & 57	Objection	<ul style="list-style-type: none"><li>Dependent on rejected base claims, but otherwise allowable.</li></ul>
4 & 7	Objection	<ul style="list-style-type: none"><li>Grammatical concerns.</li></ul>
13 & 39	§112, First Paragraph Enablement	<ul style="list-style-type: none"><li>Lack of enablement for claim language.</li></ul>
1-12, 14, 17, 18, 21-23, 27-38, 40, 43, 44, 47-49 & 54	§102(b) Anticipation	<ul style="list-style-type: none"><li>Alves, et al. (U.S. Patent No. 5,093,869).</li></ul>
16 & 42	§103(a) Obviousness	<ul style="list-style-type: none"><li>Alves, et al. (U.S. Patent No. 5,093,869); and</li><li>Nasar, et al. (U.S. Patent No. 5,144,685).</li></ul>
13, 39 & 55	§103(a) Obviousness	<ul style="list-style-type: none"><li>Alves, et al. (U.S. Patent No. 5,093,869); and</li><li>Itoh, et al. (U.S. Patent No. 5,386,378).</li></ul>
24-26, 50-52, 53 & 58	§103(a) Obviousness	<ul style="list-style-type: none"><li>Alves, et al. (U.S. Patent No. 5,093,869); and</li><li>Bauer, et al. (U.S. Patent No. 5,684,695).</li></ul>

- 5 Applicant has amended claims 4 and 7 and has provided discussion for distinguishing the present invention from the art cited against it. Applicant has also provided an update sheet referencing the defective declaration and attached it as an Appendix to this Amendment. Claim 58 has been amended to correct a typographical error.

Applicant thanks the Examiner for indicating the allowability of claims 15, 19, 20, 41, 45, 46, 56 & 57.

Applicant's use of reference characters in the discussion below is for illustrative purposes only and is not intended to be limiting in nature unless  
5 explicitly indicated. Citations with respect to the Specification are to the Substitute Specification, unless otherwise indicated.

#### **OBJECTIONS TO CLAIMS 4 & 7 (INFORMALITIES)**

*1. Applicant has amended claims 4 and 7 in accordance with the suggestion of the Examiner.*

10 Applicant thanks the Examiner for pointing out the grammatical issues with claims 4 and 7, and has corrected these claims in accordance with the Examiner's suggestion. Applicant respectfully requests withdrawal of this objection to claims 4 and 7.

#### **DEFECTIVE DECLARATION**

15 *2. Applicant has submitted an update sheet referencing the defective declaration and attached it as an Appendix to this Amendment.*

In the OA, on p. 2, the Examiner indicated that the declaration is defective because the citizenship information is filled out in German, and suggested appropriate correction.

20 In a telephone conversation with the Examiner on January 7, 2004, the Applicant's representative and the Examiner agreed that since the error is not one involving the substance of what was being declared, an update sheet would be acceptable to correct this problem, as opposed to providing a separately

executed supplemental declaration. Applicant has attached, as an Appendix to this Amendment, an update sheet listing the citizenship of the inventors in English, with the changes to the form highlighted.

The Applicant requests that the objection to the defective Declaration be  
5 withdrawn from the application.

**35 U.S.C. §112, FIRST PARAGRAPH, LACK OF ENABLEMENT FOR CLAIMS 13 AND 39**

*3. The Specification provides an enabling disclosure for claims 13 and 39 in a number of locations.*

In the OA, pp. 2-3, the Examiner indicates that claims 13 and 39 make  
10 reference to forming at least a portion of the surroundings-related information in such a way that it is invariant with respect to errors which occur when constructing the at least one map, but that the Specification only states that "the surroundings-related information assigned to the base element is formed in such a way that is (as far as possible) invariant with respect to errors", citing to the  
15 Substitute Specification at 8/15-17. However, the Examiner indicated that the Specification fails to give further detail such as a method for achieving this.

Applicant believes that additional support and enabling description for one of ordinary skill in the art can be found in the section immediately following the section cited by the Examiner. The Specification at 8/17 to 9/10 indicates that  
20 orthogonal base elements are suggested as environmental information. A concrete teaching for one of ordinary skill in the art for definition of the environmental information with regard to Figure 3A follows in the text of the

specification. A further exemplary embodiment for environmental information that is optimally invariant against errors is found in the Specification at 9/12-19.

The exemplary embodiment disclosed refers to a robot that creates a map  
5 of its surroundings, for example, a plan (map) of a building. Since the robot normally moves forward, errors can occur in the plan order, meaning the environment model deviates from the actual surroundings. This is disclosed at 6/26 to 7/9. Figure 1B shows such an erroneous plan. This part of the plan can, for example, be rotated by an angle. It has been shown in practice that specific  
10 types of environmental information are particularly invariant against such errors in the plan. This clearly arises from the German original version of the application, and as indicated in the Substitute Specification at 8/17-20 via the phrase "A pair of orthogonal base elements in the form of sections are particularly well suited to the method." Therefore, there is an enabling disclosure  
15 for claims 13 and 39. Applicant respectfully requests that the 35 U.S.C. §112 rejection be withdrawn from the application.

**35 U.S.C. §102(b), CLAIMS 1-12, 14, 17, 18, 21-23, 27-38, 40, 43, 44, 47-49 & 54  
ANTICIPATION BY ALVES**

*4. Alves fails to teach all of the elements of independent claims 1 and 27,  
20 and thus all remaining claims in the application by virtue of their dependence from either claim 1 or claim 27.*

In the OA, on pp. 4-5, the Examiner states that Alves anticipates each element of independent claim 1 of the application. Applicant respectfully disagrees for reasons explained below.

The present invention is directed to a computer-controlled determination of a measure of similarity of a first structure with a second structure.

In the invention, at least one basis element is determined in the first structure and in the second structure. By basis elements, are understood to be such geometric base elements into which an assembled structure can be optimally, simply divided, for example, a point or a line. Environmental information that characterizes the respective basis element is respectively associated with the basis element, whereby the environment information is at least formed via a further basis element and its geometric arrangement relative to the respective basis element. The degree of similarity which describes a similarity between the first structure and the second structure is determined for the first structure and the second structure using the respective basis element and the environmental information associated with the basis element.

Alves discloses a method and an arrangement for automatic recognition of a scene in a digital image. For this, in Alves, target objects (e.g., a ribbon), are determined in the scene. This ensues in that a specific attribute, in this case an intensity, is associated with each pixel/image point. Pixels with approximately the same intensities are respectively combined into a target object, in this case into the ribbon. For a target object, further attributes are determined such as, for example, a polarity, a width, and an orientation for the ribbon (Alves, 6/28-32).

The overall scene is coded via a network structure, an "attribute graph" with nodes and node connections. The nodes respectively represent the target

objects with their attributes, the node connections represent relationships between the target objects (Alves, 6/49-56 as well as Fig. 8C).

The attribute graph of a scene is compared with a predetermined reference attribute graph (Alves, 7/26-27). In this comparison, nodes (meaning  
5 target objects and their attributes) of the attribute graph and of the reference attribute graph are compared with one another, and node connections (meaning relationships between the objects of the attribute graph and of the reference attribute graph) are compared with one another (Alves, 7/32-34). A degree of similarity which describes a similarity between the attribute graph and the  
10 reference attribute graph is thereby determined. A target object is identified using the degree of similarity (Alves, abstract and claim 1).

One of ordinary skill in the art knows that the comparison of the graphs is a complex calculation operation. Thus, if one of ordinary skill in the art wishes to compensate for possible errors in the plan creation, this would additionally  
15 increase the calculation effort.

Alves discloses an implementation that compares the plane of the object and its relationships to one another, meaning on the plane of the attribute graphs; objects are compared with objects. Also in Alves, the attributes are associated with the objects as such, whereby the objects are complex overall  
20 structures.

However, Alves fundamentally differs from the invention with this procedure.

In the invention, the comparison of objects (meaning of structure) ensues on a lower plane, not on the object plane itself as in Alves (see above). In the invention, the comparison ensues on the plane of the basis elements, thus on the plane of the base elements into which the objects or the structures are  
5 separated.

In Alves, a target object is not further separated into such base elements or basis elements, but rather remains existing as it was recognized. A simplified description of a structure or of an object via simple, predefined and rigid basis elements, as in the invention, is not implemented in Alves. Thus, in Alves,  
10 recognized objects can, by all means, comprise complex, irregular and changing shapes.

Attributes, meaning environmental information, is associated with these base elements in the information. In contrast to this, in Alves, attributes — on a plane superordinate to the base elements — are associated with the objects.

15 Alves correspondingly also provides no suggestion for an association of environmental information with basis elements, as is the case in the invention.

Differences in the determination of the degree of similarity also arise due to the different comparisons, namely in Alves on the plane of the object (and its relationships) and, in contrast to this, in the invention on the plane of the basis  
20 elements.

Thus, as is clearly seen in Alves, the degree of similarity which is determined by the comparison of the attribute graphs is determined for the entire scene or for the image.

In contrast to this, in the invention, the degree of similarity is only determined for a structure which is comprised in an image (compare scene) (claim 1).

Thus independent claims 1 and 27 of the invention are novel in  
5 comparison with Alves. The invention exhibits significant advantages via the separation of a structure into defined basis elements and the implementation of the determination of the similarity on the plane of the basis elements. Thus the invention has a significantly lesser calculation time requirement to implement the determination of the degree of similarity in comparison to Alves. The invention  
10 also has an increased robustness with regard to possible sensor errors or modeling errors (see also the above explanations with regard to 35 USC §112).

The above remarks are also correspondingly valid for embodiments of the invention according to the dependent patent claims.

For the above reasons, Applicant believes that Alves fails to teach each of  
15 the elements as claimed by independent claims 1 and 27, and respectfully requests that the Examiner withdraw the 35 U.S.C. §102 rejection from the application.

**35 U.S.C. §103, OBVIOUSNESS OF CLAIMS 13, 16, 24-26, 39, 42, 50-52, 53, 55 AND 58 OVER VARIOUS COMBINATIONS OF ALVES, NASAR, ITOH AND BAUER**

20 5. *Applicant relies on the arguments made above with respect to the 35 U.S.C. §102 rejection over Alves and contends that the addition of Nasar, Itoh, and Bauer does not render the independent claims as being obvious.*

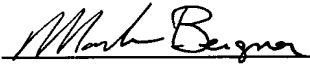


In the OA on pp. 9-13, the Examiner cites various combinations of Alves, Nasar, Itoh and Bauer as obviating the above-identified dependent patent claims in the present application. Applicant relies on the above-stated arguments under the 35 U.S.C. §102 anticipation heading, and note that the Examiner cites the  
5 additional references for elements pertaining to unrelated elements of the dependent claims. For the above cited reasons, applicant respectfully requests that the 35 U.S.C. §103 rejection be withdrawn from the application.

### CONCLUSION

Inasmuch as each of the objections have been overcome by the  
10 amendments, and all of the Examiner's suggestions and requirements have been satisfied, it is respectfully requested that the present application be reconsidered, the rejections be withdrawn and that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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Appl. No. 09/743,430  
Reply to Office Action of December 31, 2003

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Appl. No. 09/743,430

Reply to Office Action of December 31, 2003

**APPENDIX  
DECLARATION UPDATE SHEET**

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**UPDATED****German Language Declaration**

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And I hereby appoint  
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(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).